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ABSTRACT

There has been some evidence that students who develop projects for science fairs continue their interest in science through high school and beyond. Local and regional fairs generally are slated as a prelude to state science fairs and the International Science and Engineering Fair (ISEF). Organizing a district science fair requires informed leadership by the school board and professional staff working together toward the achievement of established curricular goals. Committees to organize science fairs generally include school personnel and community representatives from business and professional science organizations. The committees should address fundraising, award solicitations, selection of judges, site arrangements, publicity, and application approval. After the fair is over, thank-you notes should be sent to sponsors, award donors, and judges. Finally, an evaluation of the fair should be made by the committee, with formal and/or informal input from the judges, sponsors, participants, teachers, and attendees. (MLF)

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by Phyllis Edelman

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During the 1980's, in the wake of dozens of national reports criticizing the quality of education in the United States, many state legislatures have increased science education requirements for graduation from one year to two years or more. Requiring additional coursework alone doesn't encourage young people to pursue the scientific fields after graduation, but there has been some evidence that students who develop projects for science fairs continue their interest in science through high school and beyond.

Participation in a district science fair pays other dividends for the students. It enables them to work on public-speaking skills, including the development of poise and self-confidence, as they make oral presentations to judges and others. They learn about competition and what it takes to succeed. And by meeting judges, science educators, and science professionals from within the community, students' perception of careers in science is broadened. Many young people think about their interest in science in a new light once they realize there are career paths for them to follow other than the one leading to becoming a medical doctor or zoologist.

Science fairs enable young people to develop problem-solving skills of researching, observing, and analyzing data as they learn how to use the scientific method. The analytical skills involved in science research are important in all disciplines students study, from English to advanced placement biology.

Science fairs are not new to education. For years school systems across the nation (and in Canada) have provided a forum of one type or another for pupils to display and demonstrate projects developed in science classes.

Usually a school science fair is staged during March or April in a gymnasium, auditorium, or other common area and contains exhibits with written descriptions of each experiment along with actual aparatus (equipment) and materials (chemicals, plants, etc.). Awards or prizes often are given to participating students and a special program such as an open house for parents and nonparents may be featured. Students may be asked to describe their projects verbally to judges, visitors, and fellow students.

Many school systems combine their efforts in order to hold regional science fairs, thereby enhancing the competition and maximizing the use of judges and other science professionals. Local and regional fairs generally are slated as a prelude to state science fairs and the International Science and Engineering Fair (ISEF) so that students who take honors in district and regional fairs can participate in the state and international competitions (see accompanying box).

Organizing the fair

Organizing a district science fair takes time, money, and volunteers. It requires getting community involvement for its support. And in order to be of maximum benefit to students, it requires informed leadership by the school board and professional staff working together toward the achievement of established curricular goals.

The planning cycle for a quality fair should begin about a year in advance. A first-time venture likely will require additional lead time.

Many districts establish committees to organize science fairs. Committees generally include school personnel—teachers and science coordinators—and community representatives from business and professional science organizations. At a minimum, the committees should address fundraising, award solicitations, judge selections, site arrangements, publicity, and application approval.

Whether selected by the committee or appointed by the superintendent, a principal, or the school board, the key person to drive the fair from its initial planning stage to its culmination is the director. This person, working with the planning committee and perhaps with others as well, will be responsible for all of the key elements of the fair such as site selection, preparation of publicity, distribution of student applications, procurement of judges, selection of awards, identification of sponsorships (if any), and orgainzation of special programs or ceremonies.

The director need not be a science teacher or science coordinator. In fact, many communities purposefully tap a non-school employee such as a professor or a medical or science professional to serve as the director. For example, in Houston, the director of a recent science fair was a staff member of the University of Houston. In New York City, the science fair director is on the staff of The New York Academy of Sciences. And in Lancaster, Pennsylvania, the science fair director for the regional fair, which encompasses 16 school districts, is a staff member of the Lancaster Newspapers.

Financial support

The organizer of the fair should be capable of working within established

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Phyllis Edelman is science fair director for the American Institute of Science and Technology and a past editor of Updating School Board Policies.

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budgetary constraints—and, if deemed appropriate by the board, should be capable of raising additional funds from the community for the general support of the fair and for student awards that can provide student participants with a tangible incentive to continue their work and studies in science.

For a district just beginning a science fair program, seed money (whether from school district funds or business or private sources) could provide the impetus to get the event rolling and could encourage other community organizations to contribute as well. How much money should be provided? In Chicago, where the science fair budget is between $150,000 and $170,000, the Board of Education provides approximately $20,000, according to Mary Nalbandian, Director of Science for the school system. In New York City, where the science fair budget is $100,000 to $120,000, the Board of Education likewise provides some $20,000.

Money is important because inevitably there are certain items that will require out-of-pocket expenditures. For example, while it may be possible to hold your district fair at a school site, the school may require payment for the custodial staff to open and close the school and clean up afterwards. Moreover, you may need to hire security personnel to protect student exhibits.

In addition to the money needed for general support, money may also be needed for student awards. Monetary awards may be donated by local businesses, by professional organizations, or other sources. The Houston school science fair presents more than 200 special awards to students who participate in their fair. In addition, Texas colleges and universities award more than 30 fellowships and scholarships to students demonstrating outstanding science achievement.

Science fair awards often range from a $50 savings bond or gift certificate to a scholarship prize of more than a thousand dollars. Other awards may include books, computers, or tours of science research facilities, science museums, utility plants, or community hospitals. At a minimum, all students should receive a certificate of participation and winners should be presented with first, second, and honorable mention ribbons.

Logistics

One of the first tasks in planning for a science fair is to secure a site. Keep in mind that you need enough school space to accommodate the number of students, their projects, and anticipated attendees without violating building fire and safety regulations. The site should have ample parking on or near its premises, and should have entrances that will accomodate large displays.

If a school is not available, a local college, museum, or corporate facility with space enough to hold the number of exhibits you anticipate may be a suitable alternative.

When determining where you will hold your fair, you also need to determine the exact date(s) for the fair. The director should check the school calendar to make sure the fair won't interfere with exam dates, holidays, or other previously scheduled school events. And, as mentioned above, if you plan on sending your winners to a state science fair or the ISEF, the dates of those need to be taken into consideration. Site and date arrangements should be settled by August (if not prior to the close of the previous school year—before summer travel schedules possibly would delay committee meetings).

Rules and application forms

A first year program will require the development of rules, regulations, and application forms. Again, use a committee system and draw on the experience of teachers and science professionals in your community. Solicit copies of science fair rules, regulations, and application forms from other districts that have held such fairs. Your own set of materials should be distributed to the schools by October (when many students start working on their science projects).

At a minimum, your rules and regulations should clearly state:

- *Eligibility for participation in the science fair.* The committee must decide the grade levels that will be included. Will you have a district science fair for grades K-8 and another for high school students or one for K-6 and another for 7-12? Or will you have one big fair for all grade levels? Will you only let public school students participate or will private school students be invited as well? The amount of exhibit space you have may well be a contributing factor to your decision.
- *Limitations of total registrations.* An overall limit may be necessary, and if so, should be specified at the outset. This might be stated as an absolute number (overall total for the fair—or total entries per school). Any exception to announced quotas (e.g., specialized science and technology high schools that might merit additional spaces) should be spelled out in advance. Other matters to consider are the costs of developing a project (e.g., should there be an overall monetary limit per exhibit—and what financial assistance, if any, should the school district provide for students who do not have adequate family support?), size of exhibits, and any special display requirements.
- *Designation of special requirements.* Should student names be on student exhibits, or should the entries remain anonymous—at least until the judging is completed? Should written abstracts be required? What type of interview procedure should be followed by your judges? Will you require advance approval for all entries (as a means of guarding against the use of toxic substances, vertebrates, and human subjects)? If your school system has policies or regulations regarding the use of such

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items, these should be incorporated in the fair's rules and regulations. The ISEF stresses that students must adhere to the humane treatment of animals and that a certificate attesting to such be signed by a teacher-sponsor and a bio-medical supervisor.

- *Deadlines*. You should set forth in the rules and regulations the deadline for entries. This deadline should be at least a month to six weeks in advance of your fair to allow ample time to process applications and to revise plans for space needs. Application processing includes reviewing all forms to make sure applicant name, address, phone number, grade level, school name, project title, and discipline area are shown. Students who use vertebrates, vertebrate tissue, human subjects, and toxic substances should be required to fill out an additional form to make sure that these items were acquired through proper channels and, in the case of vertebrates and human subjects, that these will be treated with proper care.

Projects that don't conform with your stated rules should be disqualified, with notice of such action being promptly sent to the applicant.

Judges

If teachers or parents are selected to serve as judges, make sure they don't judge their own students or children. When possible, solicit volunteers from local college and university science departments, from science related businesses in your community and from local science organizations. Again, a committee with representatives from each of the above mentioned groups can assist you in finding judge volunteers.

Selected judges should be given some instruction before reviewing the projects and interviewing the participants. In New York City, prior to the fair, judges are mailed preliminary materials such as scoring sheets along with information giving the date, time, location, and directions to the site. You may want to provide additional instruction to judges on site.

Judges may be directed to work individually or in teams. When judging in a team (usually three or four judges per team), each judge should score the student separately. The basic criteria used for judging are: creative ability; scientific thought and/or engineering goal; thoroughness; skill; and clarity. A student's final score should be the average of all the judges' scores.

You may wish to limit the number of student projects each judge is expected to evaluate—and, in order to ensure fairness, set a minimum time limit of say, 20 minutes per project for student interviews. (Students are aware of the amount of time judges spend with other students and may feel slighted by an abbreviated interview). Likewise, a maximum time limit for interviews should be established in order to assure the completion of all interviews within the established time frame.

Holding the fair

On the opening day of the science fair—or perhaps a day or more in advance, if space and site permit—display tables should be set up, exhibits erected, electrical power (including extension cords) made available, and signs posted. If a formal awards ceremony is part of the program, audio visual equipment might be required as well as portable seating for attendees. At any rate, the time factor for equipment and materials set-up is crucial to the success of the fair, a point to be stressed to the director from the outset.

Following the judging and tallying of student scores to determine award winners, the awards ceremony should be held. The ceremony might simply be the posting of results, or (more commonly) a full-fledged public ceremony. All sponsors, award donors, school board members, local officials (including the mayor and local assemblymen), state politicians, parents, teachers, and others (particularly those who are key supporters of education and science) should be invited to view the fair and attend the awards assembly.

After the fair is over, thank-you notes should be sent to sponsors, award donors, and judges. Some school systems issue a certificate of appreciation to each judge for volunteering his or her time.

Finally, before the dust settles from this year's fair, it's time to assess the recent event and offer suggestions for the next year's event. An evaluation of the fair should be made by the committee—with formal and/or informal input from the judges, sponsors, participants, teachers, and attendees. A brief evaluation form distributed to attendees at the time of the fair would be a relatively easy and inexpensive way of eliciting feedback. Perceptions of attendees could help influence the design of the subsequent fair, particularly with regard to site, layout of the exhibits, and the awards ceremony. Special efforts to obtain feedback from the students who entered the competition as well as the judges and sponsors also should provide the committee with valuable data and information for future planning.

At a minimum, the committee should be reconvened for a post-fair meeting in order to discuss the procedures that were followed and various decisions that were made. The committee might well issue a summary report of the evaluation findings and its own observations and recommendations for use by the following year's committee. ■

ISEF Affiliation

International science fair competition is sponsored annually by the International Science and Engineering Fair (ISEF). Science fairs with more than 25 participants can affiliate with ISEF. Through affiliation, winners of local and regional fairs can receive awards from national organizations and are also eligible to participate in the international competition. Student winners who go to ISEF compete with students from the United States and eight other nations. Prizes, including full scholarships, are presented to ISEF winners. In addition, 51 outside organizations send judges to determine specialized winners and to award prizes above and beyond those of the ISEF. The categories recognized by ISEF for which students may enter projects are:

- Behavorial and Social Sciences
- Biochemistry
- Botany
- Chemistry
- Computer Sciences
- Earth and Space Sciences
- Engineering
- Environmental Sciences
- Mathematics
- Medicine
- Microbiology
- Physics
- Zoology

Information on ISEF participation can be obtained by writing to Science Service, 1719 N Street, N.W., Washington, D.C., 20036, or by calling Dorothy Schriver (202/785-2255).

policy Adviser

What should be included in a policy on student fund-raising activities? —*Assistant Superintendent, Nebraska.*

Fund raising activities involve community, school staff, and students, and may lead to controversy—particularly when well developed policies are not in place. A good example of the controversial element inherent in fund raising activities happened recently in California where a senior drum major was dismissed from the band for selling only one box of chocolate bars during the annual campaign to raise money for the band. According to a newspaper account, the band director indicated the student's failure to sell more candy reflected a poor attitude and set a bad example for other band members. The case is now in court.

To help avoid similar controversy, a board needs clearly stated policy covering every aspect of student fund raising, taking into account the human dynamics of the affected group(s). Policy should reflect the board's concern that fund raising activities involving the community will not have a negative effect on school-community relations. Staff members and students need guidelines to deal with indirect details of fund raising projects. It must, therefore, be made clear that students have the right to choose not to participate, and that undue pressures will not be put on those who do participate.

It is common for boards to have a general statement that relates fund raising activities to instructional goals and the overall educational experience of students. Most boards require school-related organizations to obtain approval for fund raising projects from the school principal. Requests for approval generally include inforamtion about the purpose and relationship of the activity to the organizations' goals, the time period for the fund raising activity, and how the funds will be raised, accounted for, and dispersed. Many boards require the fund-raising organization to file a written financial report with the principal's office for public inspection and audit.

In developing local policy on fund raising, consider the inclusion of language regarding:

- door-to-door solicitations
- approval for the immediate attendance area, only
- raffles and lotteries (whether permitted or not)
- any type of sale items that should be avoided or prohibited
- number of fund-raising events per year
- the quality of the items for sale
- age or grade limits for participating students
- approved time for both students and staff to conduct fund-raising projects (e.g., during non-instructional time, only).

When developing a policy on student fund raising, consult with legal counsel. School policy must comply with all applicable laws and regulations. ■

For more policy help

Sample policies and a regulation relating to topics covered in this month's *Updating* are included in the school administrator's copy of this publication. These are:

Science Fairs: IGDH, Contests for Students.

Election Activities: GBG, Staff Participation in Political Activities; KJ, Advertising in the Schools; KK, Visitors to the Schools.

Seven Period Day: IHC, Scheduling for Instruction.

Fund Raising: IGDF-R, Student Fund-Raising Activities.

Additional sample policies, regulations, or exhibits on these and other topics may be requested from the EPS Policy Information Clearinghouse, NSBA, 1680 Duke Street, Alexandria, Virginia 22314.

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